

# *PRICE AND GESS*

JOSEPH W. PRICE  
ALBIN H. GESS  
MICHAEL J. MOFFATT  
GORDON E. GRAY III  
BRADLEY D. BLANCHE

ATTORNEYS AT LAW

2100 S.E. MAIN STREET, SUITE 250

IRVINE, CALIFORNIA 92614-6238

A PROFESSIONAL CORPORATION  
TELEPHONE: (949) 261-8433  
FACSIMILE: (949) 261-9072  
FACSIMILE: (949) 261-1726

OF COUNSEL  
JAMES F. KIRK

e-mail: [pgu@pgulaw.com](mailto:pgu@pgulaw.com)

## **PRELIMINARY AMENDMENT**

Inventor(s): Hiroyuki Kado et al.

Title: PLASMA DISPLAY PANEL MANUFACTURING  
METHOD FOR ACHIEVING LUMINESCENCE  
CHARACTERISTICS

Attorney's  
Docket No.: NAK1-BN30a

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:

Hiroyuki Kado, et al.

Serial No.:

Filed:

For: A PLASMA DISPLAY PANEL AND PLASMA  
DISPLAY PANEL MANUFACTURING  
METHOD FOR ACHIEVING IMPROVED  
LUMINESCENCE CHARACTERISTICS

Examiner:

Group Art Unit:

Irvine, California 92614

August 21, 2001

**PRELIMINARY AMENDMENT**

Assistant Commissioner for Patents  
Washington, D.C. 20231

Dear Sir:

Prior to an examination on the merits of the above-identified application, please enter the following amendments:

**IN THE SPECIFICATION:**

Please replace the third and fourth paragraphs on page 4 with the following re-written paragraphs:

In order to achieve the above object, a PDP manufacturing process is performed in the following way. First, a front plate and a back plate, on at least one of which discharge electrodes have been arranged and on at least one of whose inner surfaces a phosphor layer has been formed

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are sealed together so that an inner space is formed between them. Then an aging process in which a required discharge voltage is applied to the discharge electrodes is performed. The aging process includes an introducing process in which a discharge gas with a partial steam pressure of 15 Torr or less is newly introduced into the inner space from the outside and an evacuating process, in which discharge gas is evacuated from the inner space. By performing the introducing process together with the evacuating process, discharge gas can be circulated continuously or intermittently through the inner space, while a required discharge voltage is applied to the discharge electrodes, thereby enabling discharge to be produced.

Furthermore, a PDP manufacturing process may be performed in the following way. First, a front plate and a back plate, on at least one of which discharge electrodes have been arranged and on at least one of whose inner surfaces a phosphor layer has been formed are sealed together so that an inner space is formed between them. Then an aging process in which a required discharge voltage is applied to the discharge electrodes is performed. The aging process includes an introducing process in which a discharge gas with a partial steam pressure of 15 Torr or less is newly introduced into the inner space from the outside and an evacuating process, in which discharge gas is evacuated from the inner space. The discharge generated when a required discharge voltage is applied to the discharge electrodes is divided into a plurality of discharge periods. By performing the introducing and evacuating processes in the intervals between the discharge periods, discharge gas can be circulated through the inner space.

Here, the introducing process introduces gas via a first air vent formed in the panel, and the evacuating process evacuates gas via a second air vent formed in the panel.

Please delete the second and third paragraphs on page 5.

Please replace the fourth paragraph on page 5 with the following re-written paragraph:

Consequently, the PDP subject to the aging process has the following structure. A plurality of discharge spaces are formed by arranging a plurality of partitions to divide up the inner space between the front plate and the back plate, and a sealing glass layer for sealing the panel is included between the perimeters of the front plate and the back plate. Then a first space connected to the discharge spaces formed by the plurality of partitions is formed between first ends of the plurality of partitions and the sealing glass layer, and a second space connected to the discharge spaces is formed between second ends of the plurality of partitions and the sealing glass layer.

Please replace the third paragraph on page 8 with the following re-written paragraph:

In this kind of structure, discharge gas mainly flows through a plurality of gas passages leading from the first to the second space. This prevents deterioration in the phosphors during the aging process.

Please delete the fourth paragraph on page 8.

Please replace the fifth paragraph on page 8 with the following re-written paragraph:

The partial pressure of steam contained in the discharge gas introduced into the inner space should preferably be 10 torr or less, 5 torr or less, 1 torr or less or even 0.1 torr or less.

Please replace the sixth paragraph on page 8.

Please replace the first paragraph on page 9 with the following re-written paragraph:

In order to achieve the above object, a PDP manufacturing process is further performed in the following way. First, a front plate and a back plate, on at least one of which discharge electrodes have been arranged and on at least one of whose inner surfaces a phosphor layer has been formed are sealed together so that an inner space is formed between them. Then a heating process for heating phosphors in the phosphor layer is performed after the aging process has been completed. This heating process enables the characteristics of the phosphors to be restored.

**IN THE CLAIMS:**

Please cancel Claims 1-110 without prejudice.

Please add the following newly drafted Claims 111-130.

111. (New) A plasma display panel (PDP) manufacturing method, for manufacturing a PDP comprising a front plate and a back plate, on at least one of which discharge electrodes have been arranged and on at least one of whose inner surfaces a phosphor layer has been formed, the front and back plates being sealed together so that an inner-space is formed therebetween, and an aging process then being performed by applying a required discharge voltage to the discharge electrodes while a discharge gas is present in the inner space,

the aging process comprising:

an introducing process for newly introducing discharge gas with a partial steam pressure of no more than 15 Torr into the inner space from outside; and

an evacuating process for evacuating the discharge gas from the inner space,

the introducing process being performed together with the evacuating process, enabling discharge to be produced by applying a required discharge voltage to the discharge electrodes while circulating discharge gas continuously or intermittently through the inner space.

112. (New) A PDP manufacturing method, for manufacturing a PDP comprising a front plate and a back plate, on at least one of which discharge electrodes have been arranged and on at least one of whose inner surfaces a phosphor layer has been formed, the front and back plates being sealed together so that an inner space is formed therebetween, and an aging process then being performed by applying a required discharge voltage to the discharge electrodes while a discharge gas is present in the inner space,

7 the aging process comprising:

8 an introducing process for newly introducing discharge gas with a partial steam

9 pressure of no more than 15 Torr into the inner space from outside; and

10 an evacuating process for evacuating the discharge gas from the inner space,

11 a discharge produced when a required discharge voltage is applied to the

12 discharge electrodes being divided into a plurality of discharge periods, and the introducing

13 process being performed together with the evacuating process in intervals between discharge

14 periods, enabling the discharge gas to be circulated through the inner space.

113. (New) The PDP manufacturing method of Claim 111, wherein the discharge gas  
introduced into the inner space is a dry gas.

114. (New) The PDP manufacturing method of Claim 113, wherein the discharge gas  
introduced into the inner space is an inert gas.

115. (New) The PDP manufacturing method of Claim 114, wherein the inert gas  
includes one of helium, neon, argon and xenon.

116. (New) The PDP manufacturing method of Claim 111, wherein the introducing  
process introduces the discharge gas via a first air vent formed in the panel;

the evacuating process evacuates the introduced discharge gas through a second  
air vent formed in the panel; and

the PDP subjected to the aging process has the following structure:

a plurality of discharge spaces are formed by arranging a plurality of partitions to  
divide up the inner space between the front plate and the back plate;

8 a sealing glass layer for sealing the front plate to the back plate is included  
9 between the perimeters of the front plate and the back plate;

10 a first space connected to the discharge spaces formed by the plurality of  
11 partitions is formed between first ends of the plurality of partitions and the sealing glass layer,

12 a second space connected to the discharge spaces is formed between second ends  
13 of the plurality of partitions and the sealing glass layer,

14 the first air vent is formed to connect with the first space, and

15 the second air vent is formed to connect with the second space,

16 and wherein the above structure is subject to an aging process in which the  
17 discharge gas is circulated through the discharge space by performing the introducing process by  
18 introducing the discharge gas into the first space via the first air vent, and the evacuating process  
19 by evacuating the discharge gas from the second space via the second air vent.

1 117. (New) The PDP of Claim 116, further having a structure in which the discharge gas  
2 mainly flows through a plurality of gas passages leading from the first space into the second  
3 space.

1 118. (New) The PDP of Claim 117, further having a structure in which a minimum  
2 distance between partition ends of the plurality of partitions, excluding at least a partition  
3 furthest from the first air vent, and the sealing glass layer bordering the first space is more than a  
4 minimum distance between the sealing glass layer parallel to the partitions and an adjacent  
5 partition.

1 119. (New) The PDP of Claim 117, further having a structure in which one part of each  
2 outermost partition among the plurality of partitions is connected with one part of the sealing

3 glass layer to prevent discharge gas from flowing into space between the outermost partitions  
4 and the sealing glass layer.

1 120. (New) The PDP of Claim 118, further including a structure in which the first air  
2 vent is formed in the vicinity of one of the outermost partitions, and the second air vent is formed  
3 in the vicinity of the other outermost partition, on an opposite side to the first air vent.

1 121. (New) The PDP manufacturing method of one of Claim 111, wherein the  
2 introducing process introduces the discharge gas via a first air vent formed in the panel;

3 the evacuating process evacuates the introduced discharge gas through a second  
4 air vent formed in the panel; and the PDP subjected to the aging process has the following  
5 structure:

6 a plurality of discharge spaces are formed by arranging a plurality of partitions to  
7 divide up the inner space between the front plate and the back plate;

8 a sealing glass layer for sealing the front plate to the back plate is included  
9 between the perimeters of the front plate and the back plate;

10 a barrier is included between the front plate and the back plate, around the inside  
11 of the sealing glass layer;

12 a first space connected to the discharge spaces formed by the plurality of  
13 partitions is formed between first ends of the plurality of partitions and the barrier;

14 a second space connected to the discharge spaces is formed between second ends  
15 of the plurality of partitions and the barrier;

16 the first air vent is formed to connect with the first space; and

17 the second air vent is formed to connect with the second space,



18                    wherein the above structure is subject to an aging process in which the discharge  
19 gas is circulated through the discharge space by performing the introducing process by  
20 introducing the discharge gas into the first space via the first air vent, and the evacuating process  
21 by evacuating the discharge gas from the second space via the second air vent.

1            122. (New) The PDP of Claim 121, further having a structure in which the discharge gas  
2 mainly flows through a plurality of gas passages leading from the first space into the second  
3 space.

4            123. (New) The PDP of Claim 122, further-having a. structure in which a minimum  
5 distance between partition ends of the plurality of partitions, excluding at least a partition  
6 furthest from the first air vent, and the barrier bordering the first space is more than a minimum  
7 distance between the barrier parallel to the partitions and an adjacent partition.

8            124. (New) The PDP of Claim 122, further including a structure in which one part of  
9 each outermost partition among the plurality of partitions and one part of the barrier are  
10 connected to prevent discharge gas from flowing into space between the outermost partitions and  
11 the barrier.

1            125. (New) The PDP of Claim 123, further having a structure in which the first air vent  
2 is formed in the vicinity of one of the outermost partitions, and the second air vent is formed in  
3 the vicinity of the other outermost partition, on an opposite side to the first air vent.

1            126. (New) The PDP manufacturing method of Claim 112, wherein the discharge gas  
2 introduced into the inner space is a dry gas.

1            127. (New) The PDP manufacturing method of Claim 112, wherein the introducing

process introduces the discharge gas via a first air vent formed in the panel;  
the evacuating process evacuates the introduced discharge gas through a second  
air vent formed in the panel; and  
the PDP subjected to the aging process has the following structure:  
a plurality of discharge spaces are formed by arranging a plurality of partitions to  
divide up the inner space between the front plate and the back plate;  
a sealing glass layer for sealing the front plate to the back plate is included  
between the perimeters of the front plate and the back plate;  
a first space connected to the discharge spaces formed by the plurality of  
partitions is formed between first ends of the plurality of partitions and the sealing glass layer,  
a second space connected to the discharge spaces is formed between second ends  
of the plurality of partitions and the sealing glass layer,  
the first air vent is formed to connect with the first space, and  
the second air vent is formed to connect with the second space,  
and wherein the above structure is subject to an aging process in which the  
discharge gas is circulated through the discharge space by performing the introducing process by  
introducing the discharge gas into the first space via the first air vent, and the evacuating process  
by evacuating the discharge gas from the second space via the second air vent.

128. (New) The PDP of Claim 119, further including a structure in which the first air  
vent is formed in the vicinity of one of the outermost partitions, and the second air vent is formed  
in the vicinity of the other outermost partition, on an opposite side to the first air vent.

129. (New) The PDP manufacturing method of Claim 112, wherein the introducing

process introduces the discharge gas via a first air vent formed in the panel;

the evacuating process evacuates the introduced discharge gas through a second air vent formed in the panel; and the PDP subjected to the aging process has the following structure:

a plurality of discharge spaces are formed by arranging a plurality of partitions to divide up the inner space between the front plate and the back plate;

a sealing glass layer for sealing the front plate to the back plate is included between the perimeters of the front plate and the back plate;

a barrier is included between the front plate and the back plate, around the inside of the sealing glass layer;

a first space connected to the discharge spaces formed by the plurality of partitions is formed between first ends of the plurality of partitions and the barrier;

a second space connected to the discharge spaces is formed between second ends of the plurality of partitions and the barrier;

the first air vent is formed to connect with the first space; and

the second air vent is formed to connect with the second space,

wherein the above structure is subject to an aging process in which the discharge gas is circulated through the discharge space by performing the introducing process by introducing the discharge gas into the first space via the first air vent, and the evacuating process by evacuating the discharge gas from the second space via the second air vent.

130. (New) The PDP of Claim 124, further having a structure in which the first air vent is formed in the vicinity of one of the outermost partitions, and the second air vent is formed in the vicinity of the other outermost partition, on an opposite side to the first air vent.

## REMARKS

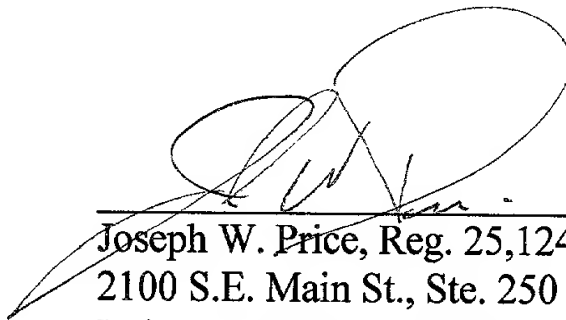
The amendments to the specification, claims and newly drafted Claims 111-130 are in accordance with a Rule 34 Amendment submitted during the prosecution of the International Application and also to remove multiple dependencies.

For the Examiner's convenience, replacement pages indicating the changes to the specification are attached as pages 4 and 4/1, 5, 8, 9 and 9/1.

If the Examiner believes that a telephone interview will help further the prosecution of this case, he is respectfully requested to contact the undersigned attorney at the listed telephone number.

Very truly yours,

PRICE AND GESS



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Joseph W. Price, Reg. 25,124  
2100 S.E. Main St., Ste. 250  
Irvine, California 92614  
949/261-8433

## VERSION WITH MARKINGS TO SHOW CHANGES MADE

### IN THE SPECIFICATION:

The third and fourth paragraphs on page 4 have been amended as follows:

In order to achieve the above object, a PDP manufacturing process is performed in the following way. First, a front plate and a back plate, on at least one of which discharge electrodes have been arranged and on at least one of whose inner surfaces a phosphor layer has been formed are sealed together so that an inner space is formed between them. Then an aging process in which a required discharge voltage is applied to the discharge electrodes [takes place] is performed. The aging process includes an [evacuating process, in which discharge gas is evacuated from the inner space.

Here, the aging process also includes an introducing process, in which gas is newly introduced into the inner space from the outside.] introducing process in which a discharge gas with a partial steam pressure of 15 Torr or less is newly introduced into the inner space from the outside and an evacuating process, in which discharge gas is evacuated from the inner space. By performing the introducing process together with the evacuating process, discharge gas can be circulated continuously or intermittently through the inner space, while a required discharge voltage is applied to the discharge electrodes, thereby enabling discharge to be produced.

Furthermore, a PDP manufacturing process may be performed in the following way. First, a front plate and a back plate, on at least one of which discharge electrodes have been arranged and on at least one of whose inner surfaces a phosphor layer has been formed are sealed together so that an inner space is formed between them. Then an aging process in which a required discharge voltage is applied to the discharge electrodes is performed. The aging process includes an introducing

process in which a discharge gas with a partial steam pressure of 15 Torr or less is newly introduced into the inner space from the outside and an evacuating process, in which discharge gas is evacuated from the inner space. The discharge generated when a required discharge voltage is applied to the discharge electrodes is divided into a plurality of discharge periods. By performing the introducing and evacuating processes in the intervals between the discharge periods, discharge gas can be circulated through the inner space.

[This] Here, the introducing process introduces gas via a first air vent formed in the panel, and the evacuating process evacuates gas via a second air vent formed in the panel. [Performing the introducing process together with the evacuating process enables discharge to be produced by applying the required voltage to the discharge electrodes while discharge gas is continuously through the inner space.]

Please delete the second and third paragraphs on page 5.

The fourth paragraph on page 5 has been amended as follows:

[The] Consequently, the PDP subject to the aging process has the following structure. A plurality of discharge spaces are formed by arranging a plurality of partitions to divide up the inner space between the front plate and the back plate, and a sealing glass layer for sealing the panel is included between the perimeters of the front plate and the back plate. Then a first space connected to the discharge spaces formed by the plurality of partitions is formed between first ends of the plurality of partitions and the sealing glass layer, and a second space connected to the discharge spaces is formed between second ends of the plurality of partitions and the sealing glass layer.

The third paragraph on page 8 has been amended as follows:

[This kind of structure has a plurality of gas passages leading from the first space to the second space, and is designed so that discharge gas can flow more freely into gas passages being

used as discharge spaces than into other gas passages.] In this kind of structure, discharge gas mainly flows through a plurality of gas passages leading from the first to the second space. This prevents deterioration in the phosphors during the aging process.

Please delete the fourth paragraph on page 8.

The fifth paragraph on page 8 has been amended as follows:

The partial pressure of steam contained in the [dry gas should preferably be 15 torr or less. If achievable, the partial pressure should be lowered] discharge gas introduced into the inner space should preferably be 10 torr or less, 5 torr or less, 1 torr or less or even 0.1 torr or less.

Please delete the sixth paragraph on page 8.

The first paragraph on page 9 has been amended as follows:

In order to achieve the above object, a PDP manufacturing process is further performed in the following way. First, a front plate and a back plate, on at least one of which discharge electrodes have been arranged and on at least one of whose inner surfaces a phosphor layer has been formed are sealed together so that an inner space is formed between them. Then a heating process for heating phosphors in the phosphor layer is performed after the aging process has been completed. This heating process enables the characteristics of the phosphors to be restored.

#### IN THE CLAIMS:

Claims 1-110 have been cancelled.

Claims 111-130 have been added.